EN - User's manual

CHAUVIN ARNOUX

C.A 1550

Micromanometer

Measure up

Thank you for purchasing this **CA 1550 micromanometer**.
For best results from your instrument:

- **read** these operating instructions carefully,
- **comply** with the precautions for use.


WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.


Information or useful tip.


Battery.


Magnet.


Earth.


Chauvin Arnoux has adopted an Eco-Design approach in order to design this appliance. Analysis of the complete life-cycle has enabled us to control and optimize the effects of the product on the environment. In particular this appliance exceeds regulation requirements with respect to recycling and reuse.


The CE marking indicates compliance with the European Low Voltage Directive (2014/35/EU), Electromagnetic Compatibility Directive (2014/30/EU) , Radio Equipment Directive (2014/53/EU), and Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU and 2015/863/EU).


The rubbish bin with a line through it indicates that, in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2012/19/UE: This equipment must not be treated as household waste.

PRECAUTIONS OF USE

This instrument is compliant with safety standard IEC/EN 61010-2-030 or BS EN 61010-2-030, for voltages 5V with report to ground. Failure to observe the safety instructions may result in electric shock, fire, explosion, and destruction of the instrument and of the installations.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument.
- Observe the conditions of use, namely the temperature, the relative humidity, the altitude, the degree of pollution, and the place of use.
- Do not use the instrument if it seems to be damaged, incomplete, or poorly close.
- Before each use, check the condition of the housing. Any item of which the insulation is deteriorated (even partially) must be set aside for repair or scrapping.
- Do not make measurements on bare live conductors. Use a non-contact sensor or a sensor that provides the necessary electrical insulation.
- Always wear personal protective equipment (PPE), in particular insulating gloves, if there is any doubt or it is impossible to measure the voltage levels to which the temperature sensor is connected.
- All troubleshooting and metrological checks must be done by competent, accredited personnel.

CONTENTS

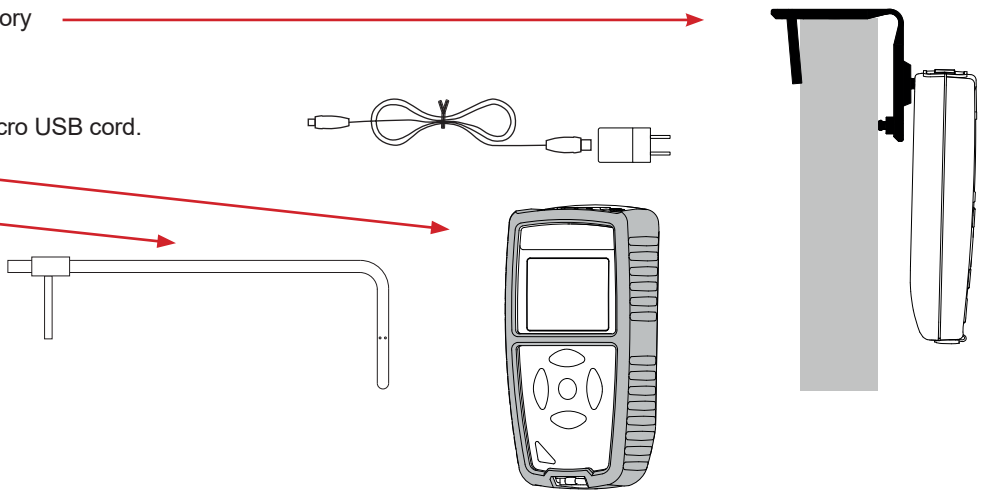
1. FIRST USE

1.1. DELIVERY CONDITION

Micro-manometer CA 1550
Supplied in a cardboard box with:
- three AA or LR6 alkaline batteries,
- two hoses,
- one USB-micro USB cord,
- one multilingual getting started guide,
- one multilingual safety data sheet,
- one test report,
- one carrying case.

1.2. ACCESSORIES

- Multi-purpose attachment accessory
- Carrying bag
- USB-Bluetooth adapter
- USB-mains adapter with USB-micro USB cord.
- Protecting sheath
- Pitot tube
- DataView application software

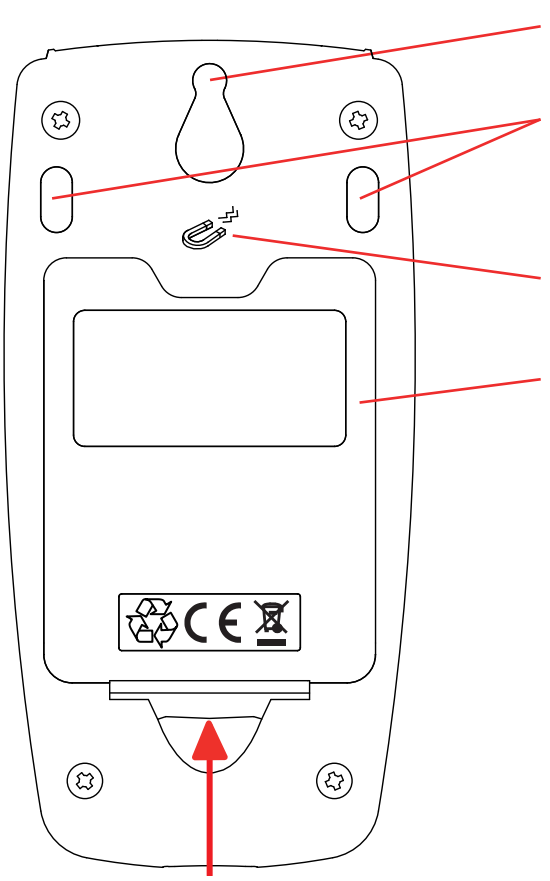


1.3. SPARE PARTS

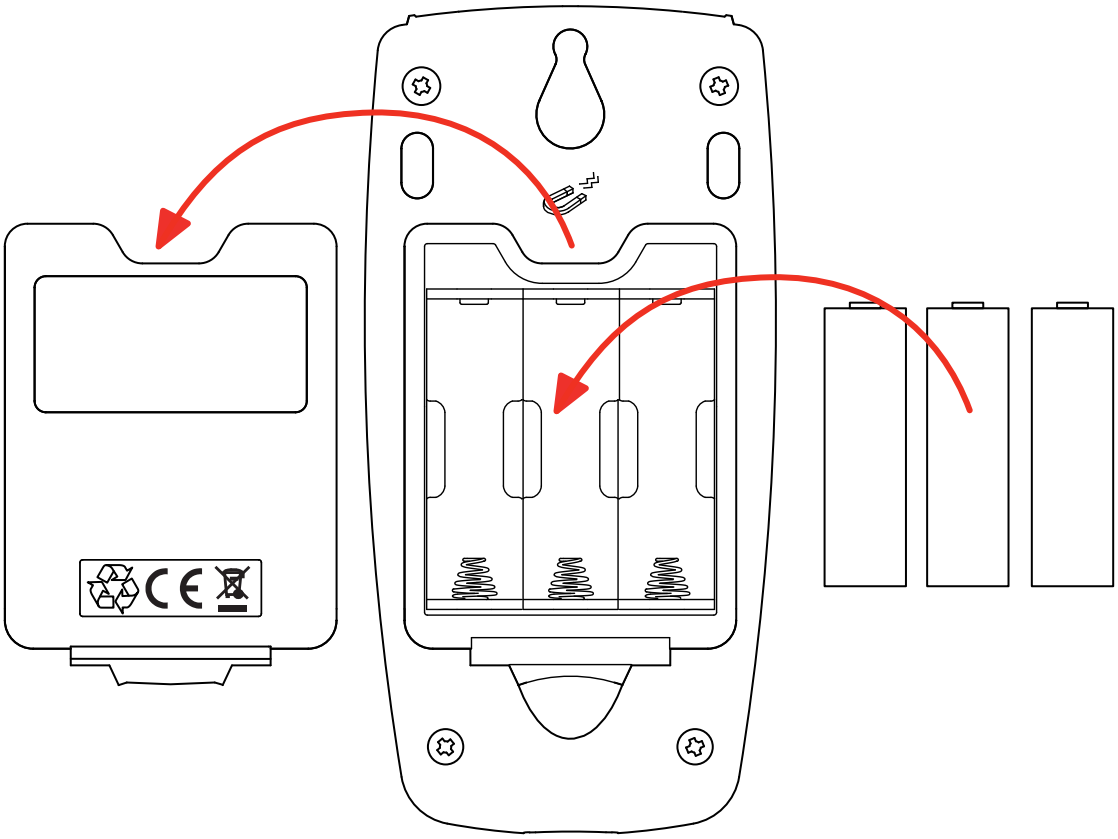
- USB-micro USB cord
- Flexible hoses

For the accessories and spares, consult our web site:
www.chauvin-arnoux.com

1.4. INSERTING THE BATTERIES

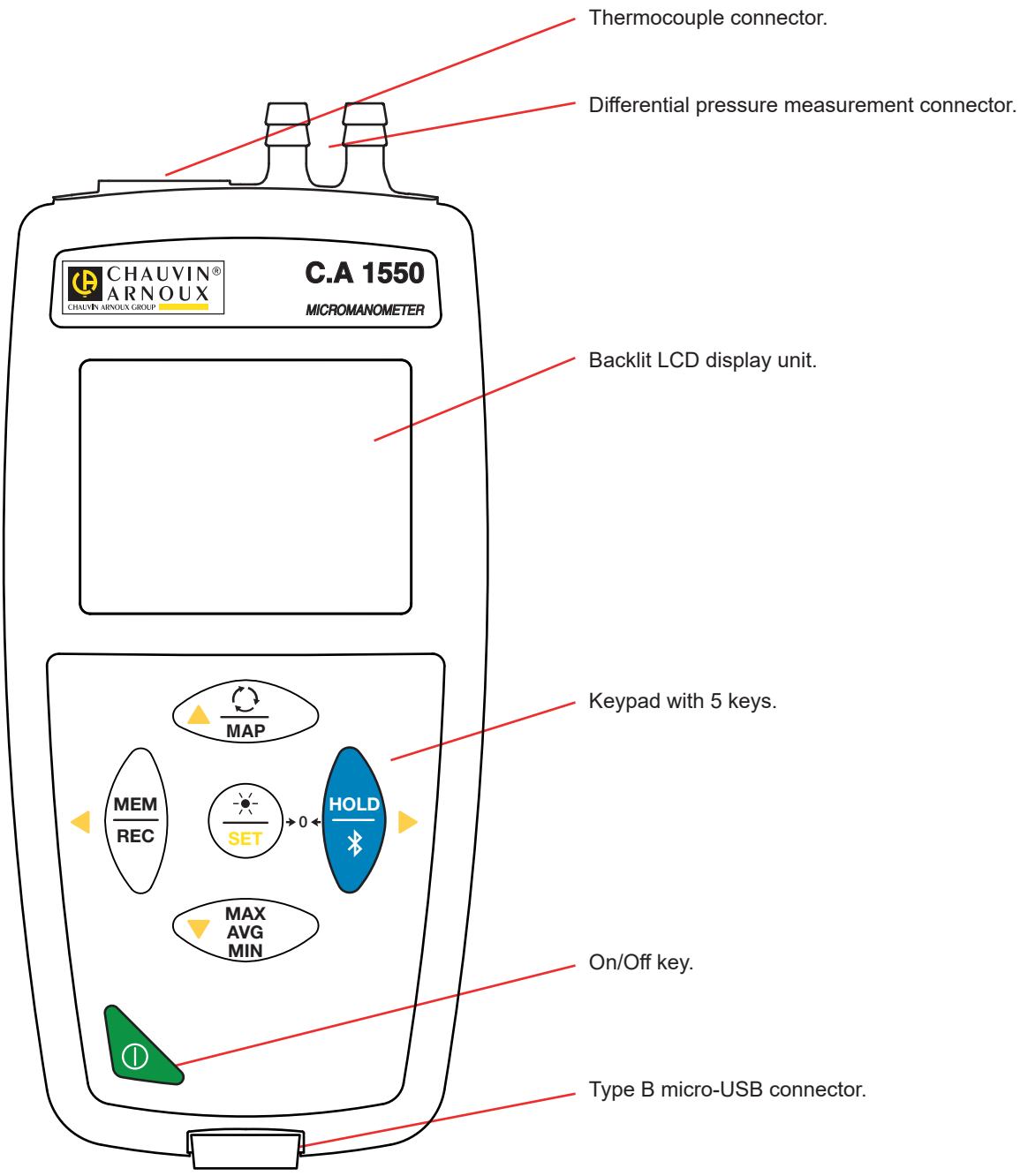


- Press the tab of the battery compartment cover and lift it clear.
- Withdraw the battery compartment cover.
- Insert the new batteries, paying attention to the polarity.
- Close the battery compartment cover; make sure that it is completely and correctly closed.



2. PRESENTATION OF THE INSTRUMENT

2.1. C.A 1550



2.2. FUNCTIONS OF THE INSTRUMENT

The CA 1550 is a micromanometer and thermometer. It is used to measure:

- temperatures from -10 to +50°C,
- differential pressures up to ±2.450Pa,
- atmospheric pressure from 500 to 1.100hPa,
- air speeds up to 60m/s,
- volume flow rates up to 9.999m³/h.

This instrument is easy to use. It can:
- to display temperature measurements in °C or in °F,
- display a differential pressure in Pa, PSI, mbar, mmHg, inHg, mmH2O, or inH2O,
- display the atmospheric pressure in Pa, PSI, or mbar,
- display the air speed in m/s, km/h, fpm, or mph,
- display a volume flow rate in m3/s, m3/h, l/s or CFM,
- to record a minimum, an average (mean), and a maximum in a specified period,
- to record a minimum, an average (mean), and a maximum on a surface (mode MAP see §3.6.3),
- to record the measurements,
- to communicate with a PC via a Bluetooth link or a USB cable,
- communicate with a smartphone or a tablet via a Bluetooth link (Android application).

The Data Logger Transfer software can be installed on a PC and is used to configure the instruments and to recover the recorded measurements.

2.3. FUNCTION KEYS

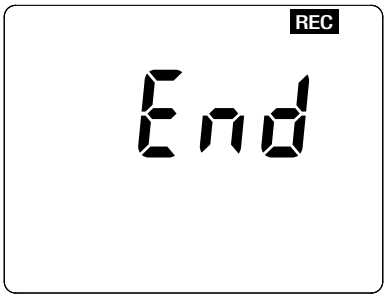
Key	Function
MAP	■ A short press on the ⟳ key selects the measurement to be displayed: differential pressure, air speed, volume flow rate, or atmospheric pressure. ■ A long press on the MAP key is used to enter or exit from the MAP mode.
MEM **REC**	■ A short press on the **MEM** key records the measurement and the date**.** In MAP mode, pressing the **MEM** key adds a measurement to the measurements of the MAP**.** ■ A long press on the **REC** key starts or stops a recording session**.**
☀ **SET**	■ A short press on the ☀ key turns the backlighting on for 30 seconds. ■ Pressing the **SET** and **HOLD** keys simultaneously zeros the differential pressure (→0←). ■ A sustained press on the **SET** key is used to enter or exit from the configuration menu, in which you can: ■ choose the unit of temperature, ■ choose the unit of pressure, ■ choose the unit of air speed, ■ choose the unit of air flow, ■ choose the unit of area, ■ program the area for the air flow calculation, ■ program the coefficient of the Pitot tube, ■ set the temperature (manual mode). Use the▲▼ keys to change the unit or reduce or increase the value, and the ◄► keys to switch from one parameter to another.
HOLD ᛒ	■ A short press on the HOLD key locks or unlocks the display. ■ A long press on the ᛒ key activates or deactivates the Bluetooth link**.**
MAX **AVG** **MIN**	■ A short press on the **MAX AVG MIN** key opens the MAX AVG MIN mode; the current values continue to be displayed**.** ■ A second press displays the maximum value**.** ■ A third press displays the average (mean) value**.** ■ A fourth press displays the minimum value**.** ■ A fifth press results in a return to the first-press condition and display of the current values ■ A long press is used to exit from the MAX AVG MIN mode**.** In the MAP mode, presses on the **MAX AVG MIN** key display in turn the maximum, average (mean), and minimum of the MAP measurements.

2.4. ON/OFF KEY

A long press on ⏻ key switches the instrument on.

A long press on ⏻ key switches the instrument off.

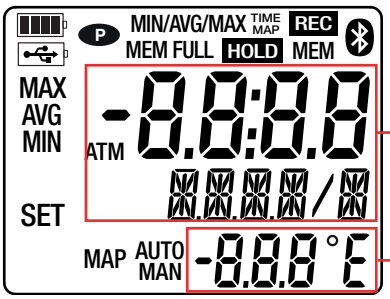
It is not possible to switch the instrument off when it is in record mode and is recording.



If during start-up the instrument displays the screen shown opposite, it means that a recording session has been brutally interrupted by a power outage.

During the display of this screen, the instrument recovers the recorded data. The longer the record, the longer the recovery. Do not interrupt the recovery or the data will be lost.

2.5. DISPLAY



Display unit for air pressure, speed, and flow.

Temperature display unit/MAP function counter.

When the measurement exceeds the limits, the instrument displays OL.

P: indicates that auto-off is disabled and the instrument is in permanent mode.

This occurs when:
- the instrument is recording, in MAX AVG MIN mode, in MAP mode, or in HOLD;
- the instrument is connected via the USB cord either to an external power supply or for communication with a PC;
- the instrument is in communication via Bluetooth;
- or auto-off is disabled (see §4.5.3).

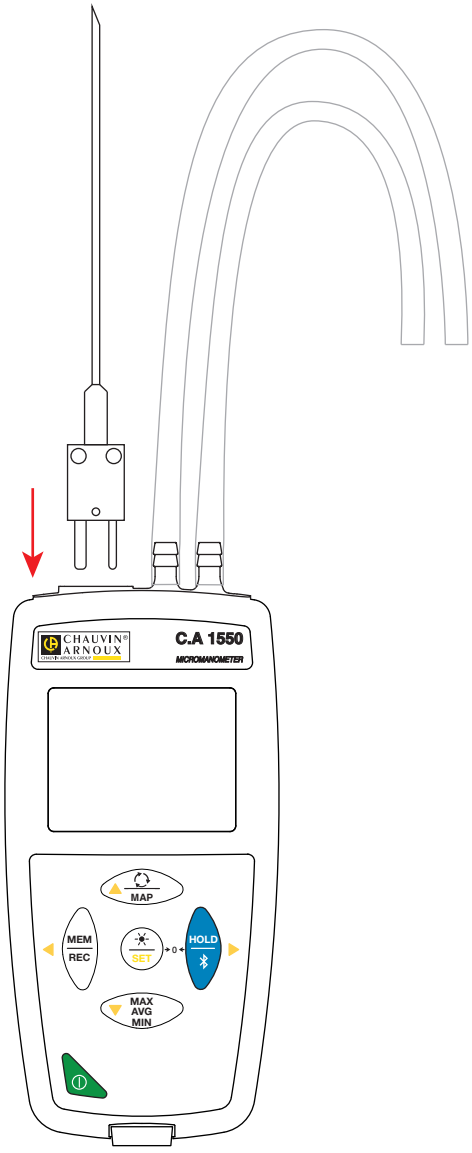
3. USE IN STAND-ALONE MODE

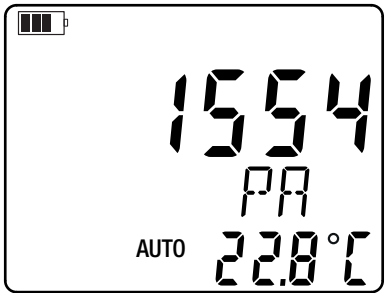
The instrument can operate in two modes:
- the stand-alone mode described in this section,
- in recorder mode, where it is controlled by a PC, a smartphone, or a tablet. This mode is described in the next section.

3.1. TEMPERATURE AND PRESSURE MEASUREMENT

- Long-press the ⏻ key to switch the instrument on.
  The instrument displays the time, then the measurement. The time is set using the Data Logger Transfer software (see §4).
- Place the instrument in its position of use and zero by pressing the **SET** and **HOLD** keys simultaneously (→0←).
- To make a temperature measurement, connect a thermocouple (optional). The temperature measurement is then made automatically (**AUTO** symbol displayed)
  If you make a temperature measurement with another instrument, enter the temperature (see §3.5). You then switch to manual mode (**MAN** symbol displayed).
- To make a pressure measurement, connect the hoses provided to the differential pressure connector of the instrument.

Wait for the display to stabilize before reading the measurement.

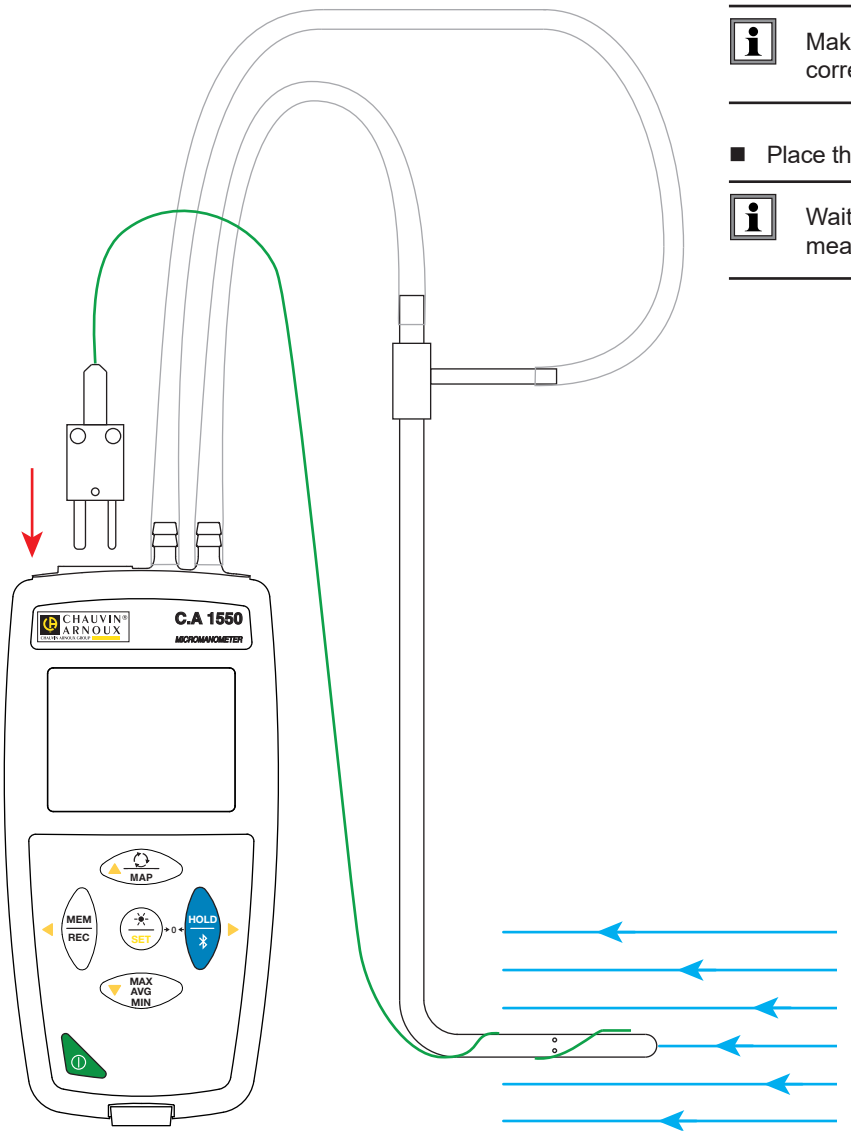




3.2. AIR TEMPERATURE AND SPEED MEASUREMENT

To make an air speed measurement, press the ⟳ key. The unit changes to a unit of speed.

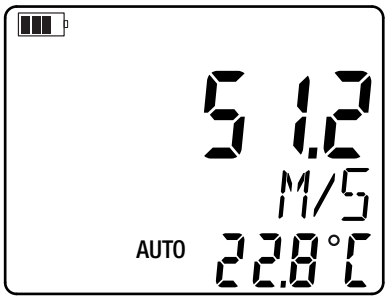
- To make a temperature measurement, connect a thermocouple (optional). The temperature measurement is then made automatically (**AUTO** symbol displayed)
  If you make a temperature measurement with another instrument, enter the temperature (see §3.5). You then switch to manual mode (**MAN** symbol displayed).
- Connect the hoses provided to the differential pressure connector of the instrument and, for example, to a Pitot tube.
  To program the coefficient of the Pitot tube, refer to §3.5.
  If the thermocouple is flexible, wrap it around the Pitot probe.



> Make sure that the sensors are connected with the correct polarity.

- Place the Pitot tube in the air flow to be measured.

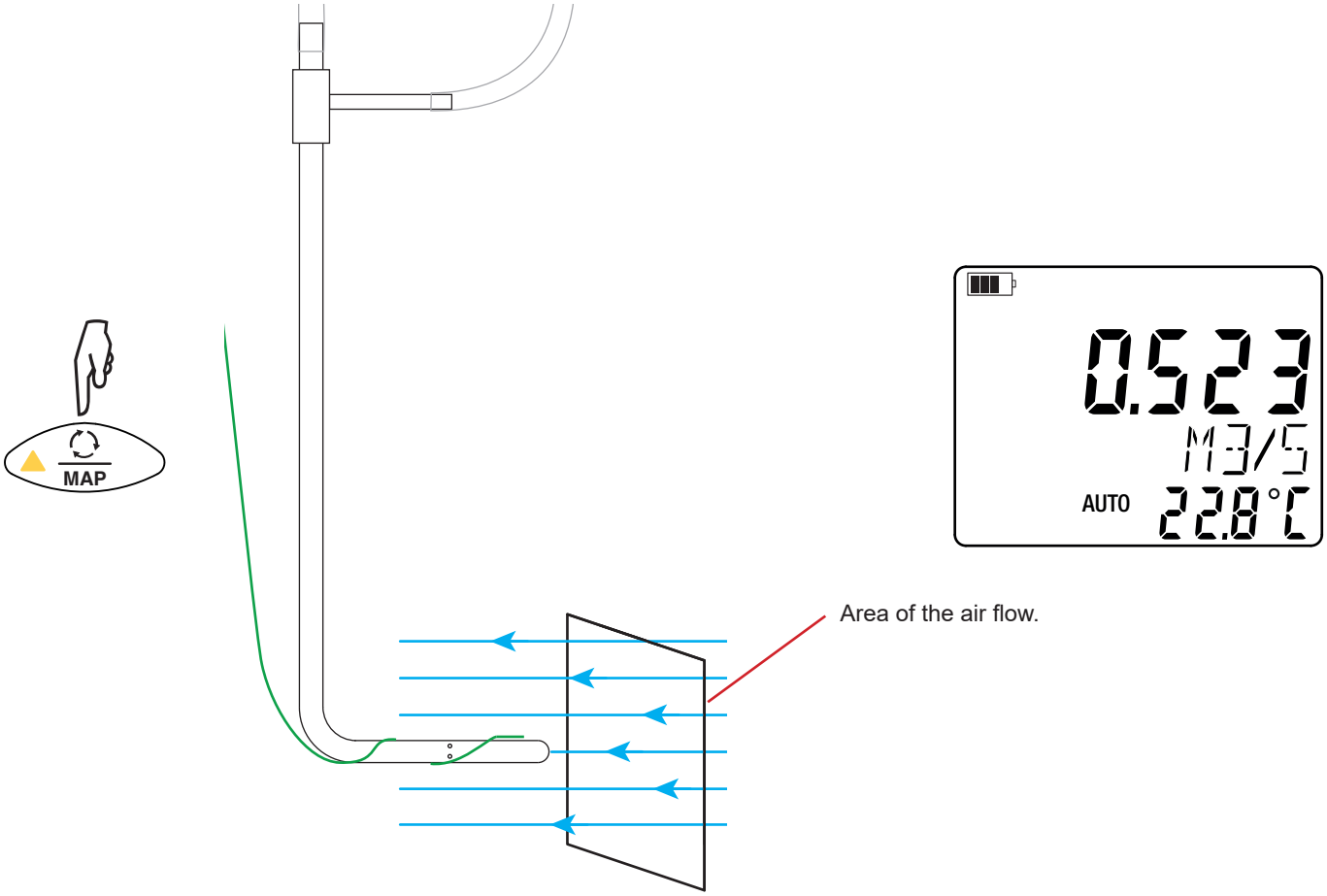
> Wait for the display to stabilize before reading the measurement.



The air speed calculation is corrected for the measured atmospheric pressure and measured temperature.

3.3. TEMPERATURE AND AIR FLOW MEASUREMENT

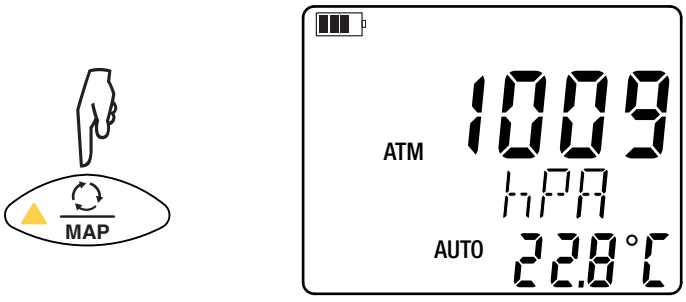
To make an air flow measurement, press the ⟳ key again. The unit changes to a unit of flow.
To program the area, refer to §3.5. In the calculation, it is assumed that the flow rate is homogeneous over the whole of the area.



3.4. TEMPERATURE AND ATMOSPHERIC PRESSURE MEASUREMENT

To measure the atmospheric pressure, press the ⟳ key again. The unit changes to a unit of atmospheric pressure.

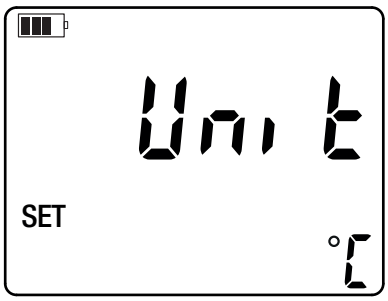
The atmospheric pressure measurement probe is inside the instrument, so there is no need to connect the hoses.



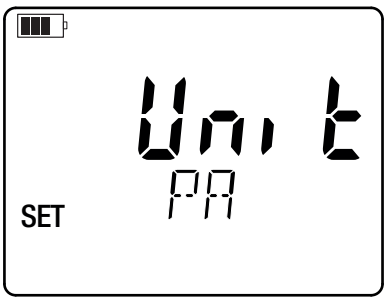
A fourth press on the ⟳ key returns the instrument to the measurement of differential pressure.

3.5. CONFIGURING THE MEASUREMENTS

To choose the measurement units, to program values, or to set the temperature, long-press the **SET** key.
This opens the configuration menu.

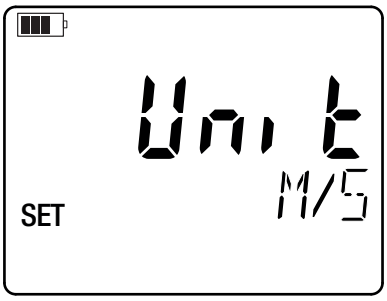


Use the ▲▼keys to choose the temperature unit:°C or °F.

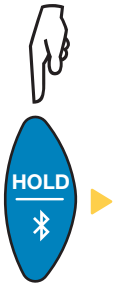


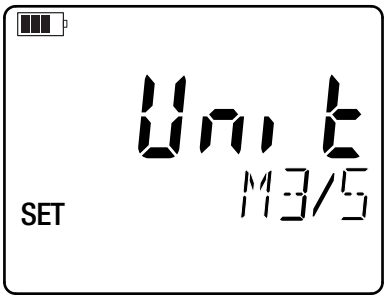
Use the ▲▼keys to choose the differential pressure unit:
- Pa: Pascal,
- PSI: pound per square inch,
- daPa: decapascals,
- hPa: hectopascal,
- mbar: millibar,
- mmHG: millimeters of mercury or Torr,
- inHG: inches of mercury,
- mmH_2O: millimeters of water,
- inH_2O: inches of water.

The Pa, PSI, and mbar units are also used for the atmospheric pressure.

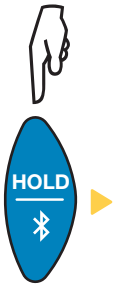


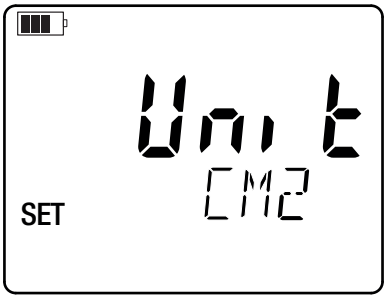
Use the ▲▼keys to choose the air speed unit:
- m/s: meters per second,
- km/h: kilometers per hour,
- fpm: feet per minute,
- mph: miles per hour.



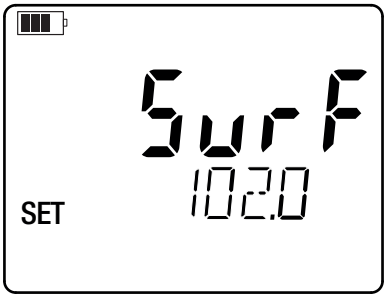


Use the ▲▼keys to choose the air flow unit:
- m^3/s: cubic meters per second,
- m^3/h: cubic meters per hour,
- CFM: cubic feet per minute,
- L/s: litres per second.

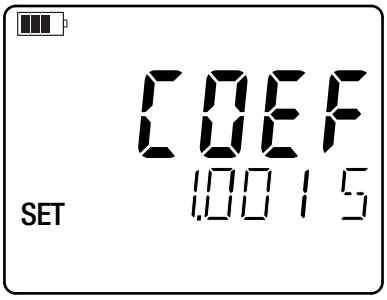




Use the ▲▼keys to choose the unit of area:
- cm^2: square centimeters,
- in^2: square inches.

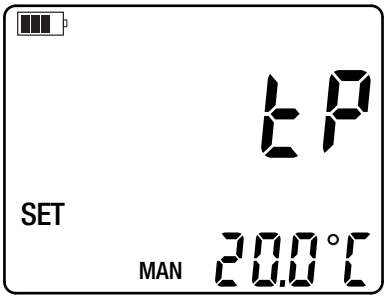


Use the ▲▼keys to set the area for the air flow calculation.
Hold the ▲ key (or the ▼key) down to increase (or decrease) the value faster.
The area that can be programmed ranges from 1 to 9.990cm² or in².



There are 3 pre-programmed coefficients and one coefficient that can be customized:
- 1.0015
- 1
- 0.84
- CUST

Use the ▲▼keys to set the coefficient of the Pitot tube. To find this coefficient, refer to the documentation from the manufacturer of the Pitot tube.



If you use a manual temperature measurement (**MAN**), set the temperature using the ▲▼ keys.

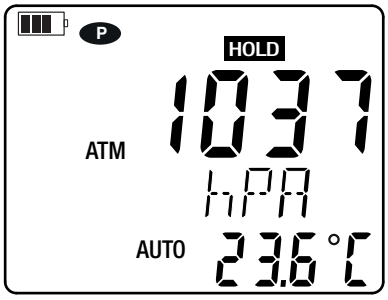
> 2s

Long-press the **SET** key to exit from the configuration menu.

3.6. OTHER FUNCTIONS

3.6.1. HOLD FUNCTION

Pressing the **HOLD** key freezes the display.
A second press unfreezes it.

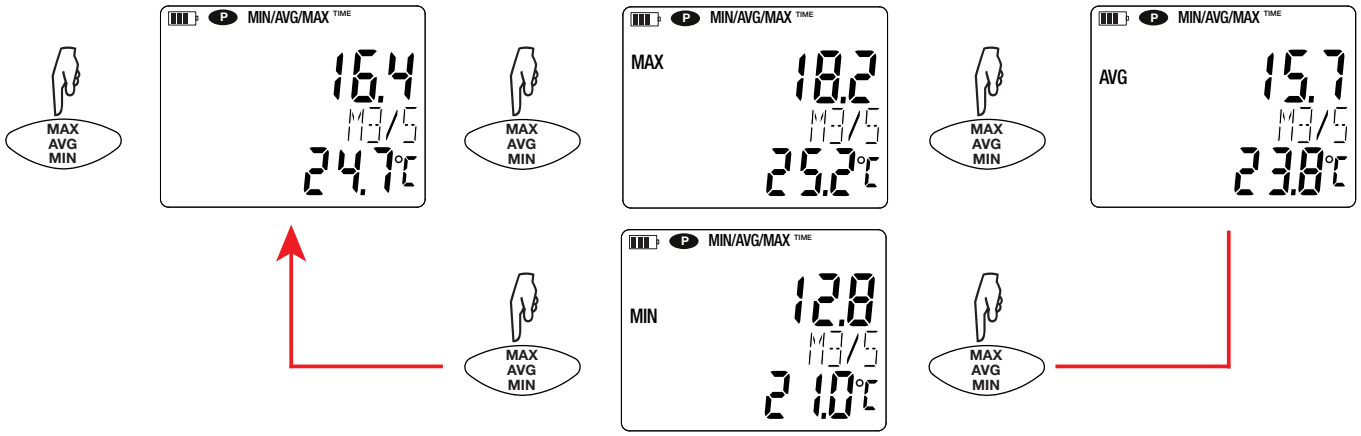


3.6.2. MAX AVG MIN FUNCTION

The MAX AVG MIN function is used to monitor the evolution of the measurements over time.

Pressing the **MAX AVG MIN** key activates the function and starts recording of the extrema and calculation of the mean.

Press the **MAX AVG MIN** key a second time and the instrument displays the maximum. Press it a third time and the instrument displays the mean. A fourth time and the instrument displays the minimum. A fifth time and it returns to the current value.



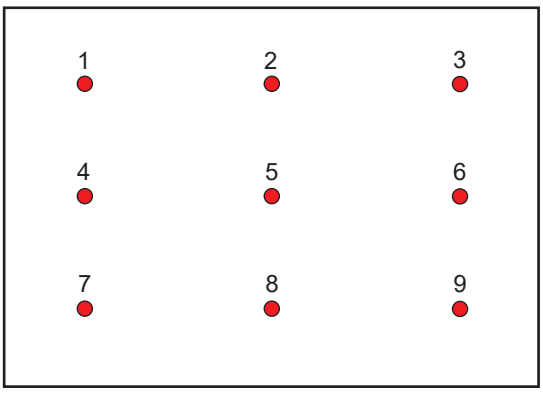
To exit from the MAX AVG MIN mode, long-press the **MAX AVG MIN** key.

3.6.3. MAP FUNCTION

The MAP function is used to create a map of the air speed or flow.

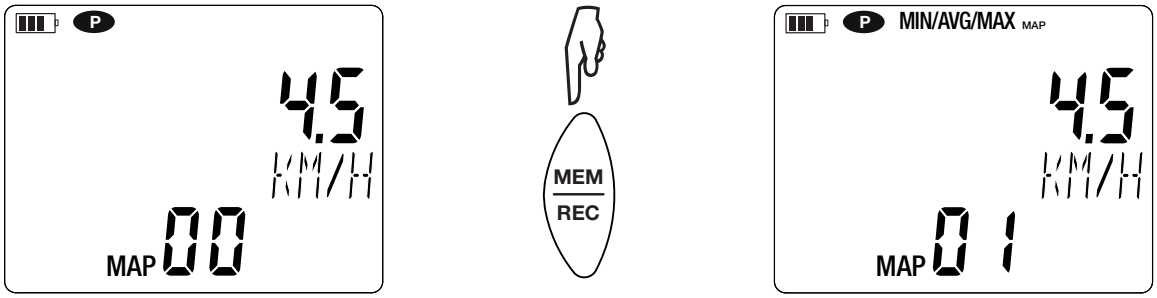
A press on the **MAP** key activates the function. The counter of the number of points recorded reads zero.

Plot a map of the zone to be measured and mark the measurement points.



● = measurement points.

Place the sensor on the first measurement point and press the **MEM** key to record the value in memory. The counter is incremented.



Proceed in the same way for all the other points of the map.

When all of the points have been entered, you can look up the maximum, the mean, and the minimum of the values entered. To do this, press the **MAX AVG MIN key 3 times.**

To exit from the MAP mode, long-press the **MAP** key.

For each map measurement, a file is created with all of the measurement points. This file can then be recovered for analysis.

3.7. RECORDING THE MEASUREMENTS

A short press on the **MEM** key records the measurement and the date.

A long press on the **REC** key starts or stops a recording session.

To see the recordings, you must use a PC and install the Data Logger Transfer software, or use a smartphone or a tablet on which the Android application has been installed (see §4).

3.8. ERRORS

The instrument detects errors and displays them in the form ErXX. The main errors are the following:

Er01: Hardware malfunction detected. The instrument must be sent in for repair.
Er02: Error in internal memory. Format it using Windows.
Er03: Hardware malfunction detected. The instrument must be sent in for repair.
Er10: The instrument has not been adjusted or is not correctly adjusted. The instrument must be sent back to customer service.
Er11: The update of the internal software is not compatible with the instrument (the software is that of another instrument of the line). Install the correct internal software in your instrument.
Er12: The update of the internal software is not compatible with the electronic boards in the instrument. Reload the previous internal software into your instrument.
Er13: Recording scheduling error. Check that the instrument's time and the time of the Data Logger Transfer software are the same.

4. USE IN RECORDING MODE

The instrument can operate in two modes:
- the stand-alone mode described in the previous section.
- recorder mode, where it is controlled by a PC, a smartphone, or a tablet; this mode is described below.

4.1. CONNECTION

The device has 2 communication modes:
- A USB link via a USB-micro USB cord, for use with a PC and the Data Logger Transfer software,
- A low-energy Bluetooth 4.0 wireless link, for use with a smartphone or a tablet and the CA Environmental Loggers application.

4.2. OBTAIN THE DATA LOGGER TRANSFER SOFTWARE

Visit our web site to download the latest version of the application software:
www.chauvin-arnoux.com

Go to the **Support** tab, then **Download our software**. Then search on the name of your instrument.

Download the software, then install it on your PC.

You must have administrator privileges on your PC to install the Data Logger Transfer software.

Minimum computer requirements:
- Windows 7 (32/64 bits), Windows 10 is recommended
- 4 GB of RAM
- 200MB of free disc space

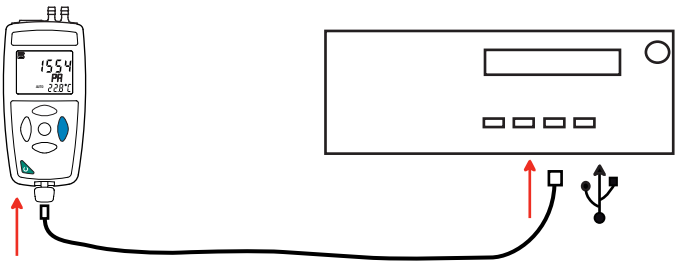
Windows® is a registered trade mark of Microsoft®.

Do not connect the instrument to the PC until you have installed the Data Logger Transfer software.

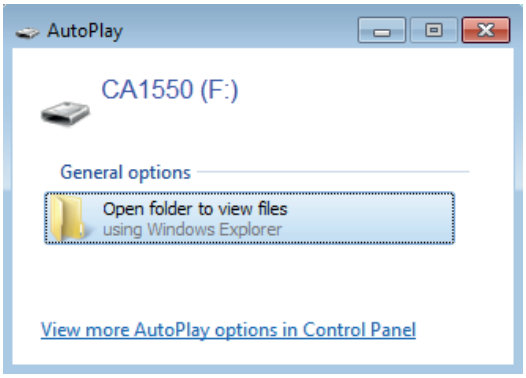
4.3. USB LINK

Long-press the ⏻ key to switch the instrument on.

Once the Data Logger Transfer software has been installed, connect the instrument to the PC.



It is treated as a USB key and you can access its content. But to read the records, you must use the Data Logger Transfer software.



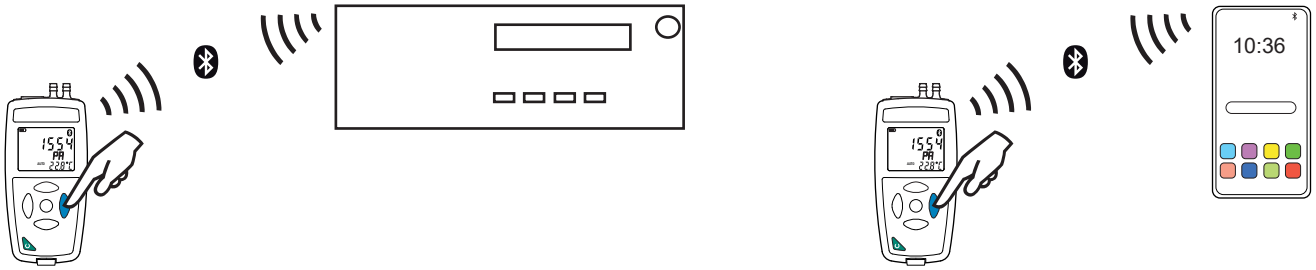
4.4. BLUETOOTH LINK

The instrument has a low-energy Bluetooth 4.0 link.

- Activate Bluetooth on your PC, your tablet, or your smartphone. If your PC does not have a Bluetooth link, you can add a board or Bluetooth adapter connected to a USB port (see §1.2).

Since Windows 7 does not manage low-energy Bluetooth, a specific USB/Bluetooth adapter must be used (see §1.2).

- Switch the instrument on by a long press on the ⏻ key, then activate the Bluetooth link by a long press on the ᛒ key. The symbol is displayed.
- The instrument is then ready to communicate with the PC, the smartphone, or the tablet.



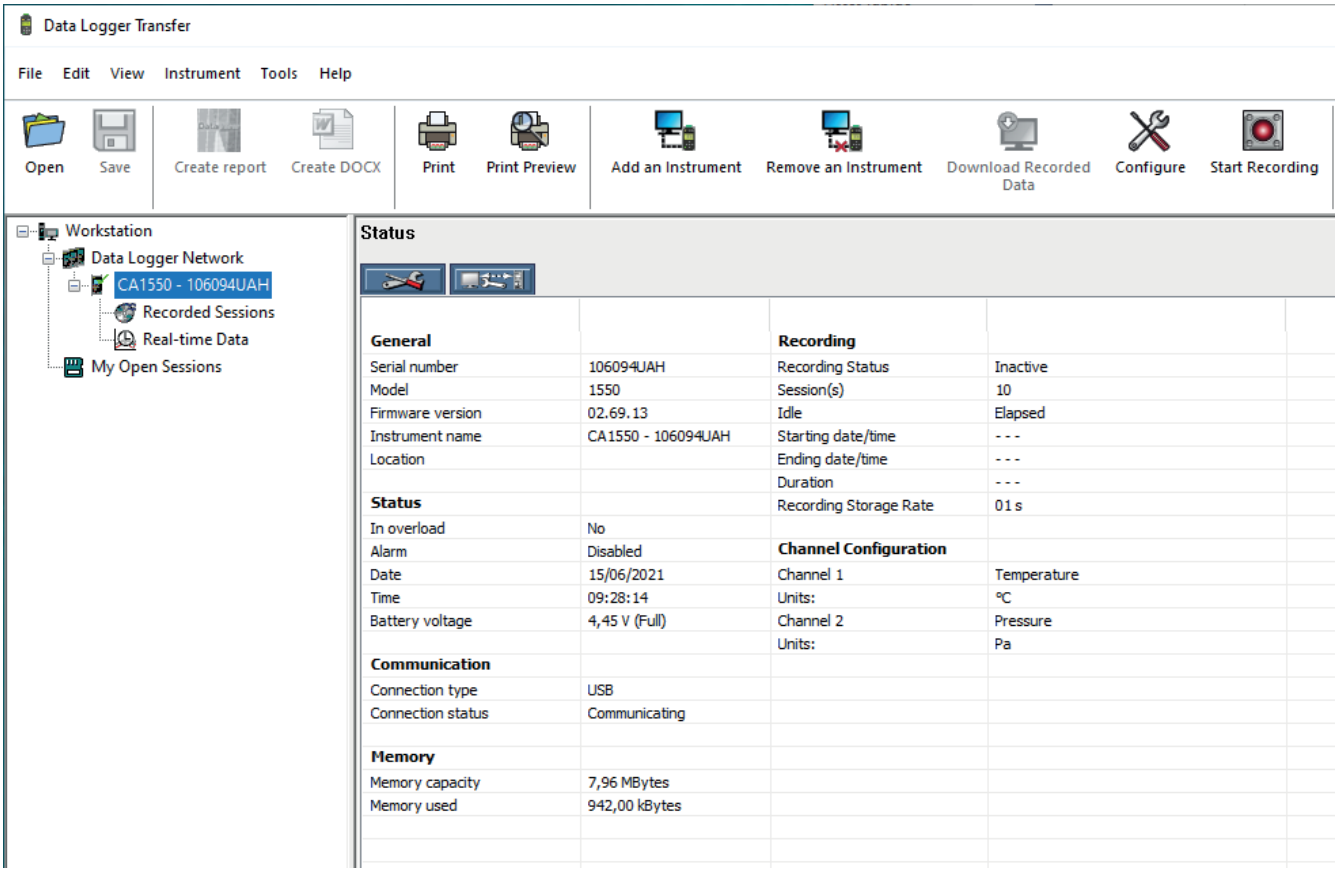
4.5. DATA LOGGER TRANSFER SOFTWARE

Once the instrument has been connected to the PC, whether by USB or by Bluetooth, open the Data Logger Transfer software.

For context-sensitive information about the use of the Data Logger Transfer software, refer to the **Help** menu.

4.5.1. CONNECTING THE INSTRUMENT

- To connect an instrument, click **Add an instrument**, **Environmental**, **1550**, then choose the type of connection (USB or Bluetooth).
- A window opens with a list of all instruments connected to the PC.
  The name of the instrument will be formed from the model of the instrument and the warranty number: CA 1550-123456ABC
- Choose your instrument in the list. The instrument then displays complete information about the instrument and its measurements in progress.
  You can personalize your instrument by adding a name and a location, by clicking on or .



4.5.2. DATE AND HOUR

The **Instrument** menu lets you set the your instrument's date and time.
These cannot be changed while recording or when a recording session has been scheduled.
By clicking , you can choose the date and time display formats.

4.5.3. AUTO OFF

As default, the instrument switches itself off automatically after 3 minutes of operation without the user's presence being confirmed by a key-press. By clicking , you can change this value to 3, 10, or 15 minutes.

It is also possible to disable this auto-off function; the instrument then displays the P symbol.

4.5.4. PROGRAMMED RECORDING SESSIONS

By clicking , you can program a recording session. Assign a name to the recording session. Then enter a starting date and time and an ending date and time or a duration. The maximum duration of a recording session depends on the memory available.

Choose a sampling period. The possible values are: 1s, 2s, 5s, 10s, 20s, 30s, 1min, 2min, 5min, 10min, 15min, 30min and 1 hour. The shorter the sampling period, the larger the recorded file.

Before and after the recording session, if the instrument is switched on, the sampling period will be that of the stand-alone mode (1s).

If the instrument is off when recording starts, it switches itself on by itself. Then it displays the measurement, which it refreshes at each sampling period.

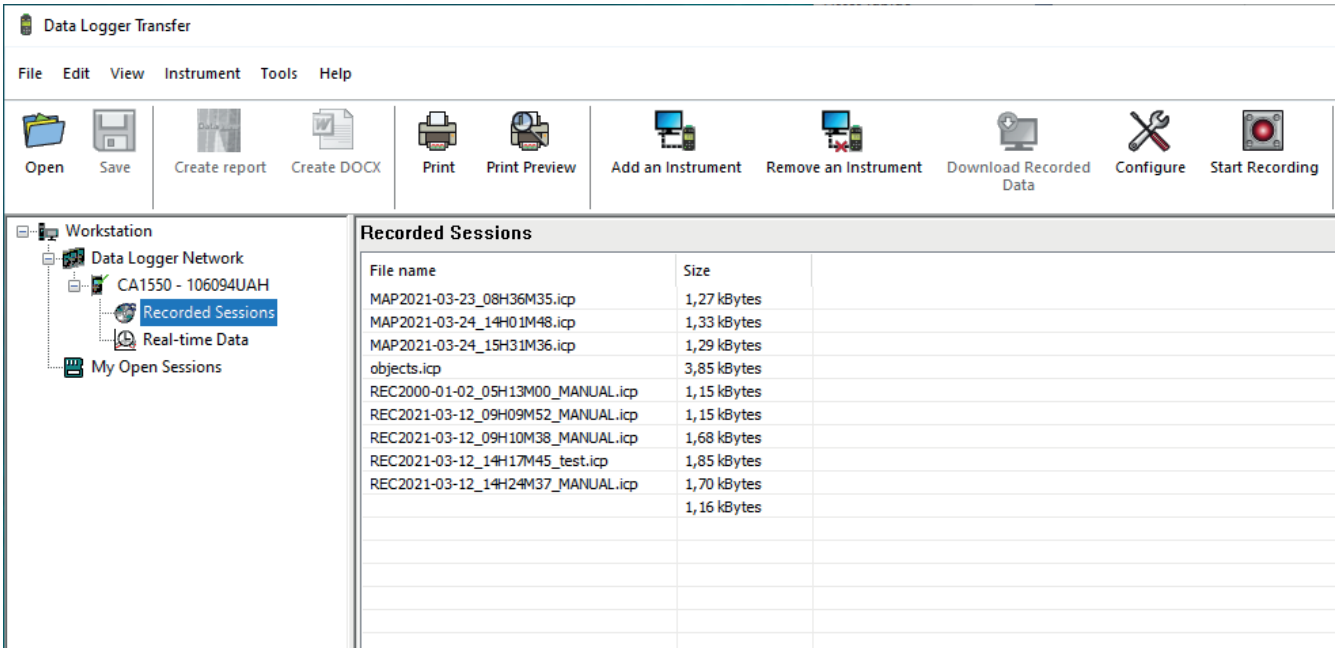
Before starting a recording session, make sure that the battery life is sufficient, or else connect the instrument to an external power supply on/to a wall outlet using a micro USB cord.

4.5.5. CONFIGURING THE MEASUREMENTS

By clicking , then going to the **Manometer** tab, you can change the units in which the measurements are displayed, just as you can by pressing the **SET** key. You can also enter the area for the air flow calculation, the coefficient of the Pitot tube, or the temperature.

4.5.6. READING THE RECORDS

The Data Logger Transfer software lets you read the records made. Click **Recorded Sessions** under the name of your instrument to obtain a list of the records.



4.5.7. EXPORTING RECORDS

Once the list of the records is displayed, choose the one you want to export and convert it into a word-processing document (docx) or a spreadsheet (xlsx), in order to be able to use it in the form of reports or curves.

It is also possible to export the data to the DataView application software (see §1.2).

4.5.8. REAL-TIME MODE

Click **Real-time data** under the name of your instrument to see the measurements being made on the instrument as they are made.

4.5.9. FORMATTING THE MEMORY OF THE INSTRUMENT

The internal memory of the instrument is already formatted. But if there is a problem (if it becomes impossible to read or to write), it may be necessary to reformat it (in Windows).

In this case, all of the data will be lost.

- Format the instrument in the file explorer,
- Eject the instrument from the file explorer,
- Disconnect the USB cord,
- Switch the instrument off and back on.

4.6. CA ENVIRONMENTAL LOGGERS APPLICATION

This Android application provides some of the functions of the Data Logger Transfer software.
It lets you connect to your instrument remotely.

Look for the application by typing Chauvin Arnoux.
Install the application on your smartphone or your tablet.

Activate Bluetooth on your smartphone or your tablet and on the CA 1550, then connect them.

The application lets you:
- see the measurements in real time,
- program a recording: choose its name, its starting and ending dates, and the sampling period,
- configure the instrument (synchronise the date and time, and enter the area for the air flow calculation),
- download the recordings.

5. TECHNICAL CHARACTERISTICS

5.1. REFERENCE CONDITIONS

Quantity of influence	Reference values
Temperature	25 ±2°C
Relative humidity	10% to 80%
Battery supply voltage	3 to 4.5V
Electric field	<1V/m
Magnetic field	<40A/m

The intrinsic uncertainty is the error specified for the reference conditions.
It is expressed in the form: a %R + b pt, where R = reading.
or in the form: a %FS +b pt where FS = Full Scale.

5.2. CHARACTERISTICS

5.2.1. TEMPERATURE MEASUREMENTS

Specified measurement range	-10.0 to +60.0°C	-14.0 to +140.0°F
Resolution	Display in °C: 0.1°C	Display in °F: 0.1°F
Intrinsic uncertainty	(±0.15%R ±0.6°C)	

Temperatures up to 200°C can be displayed.

The hoses and the differential pressure sensor must not be exposed to temperatures above 60°C.

5.2.2. DIFFERENTIAL PRESSURE

Particular conditions of reference:
- The measurement is made just after an auto-zero.
- The instrument is horizontal.
- Inert gas (clean dry air).

Specified measurement range	-2450 to +2450 Pa	-0.355 to +0.355 PSI
Resolution	0.1Pa for -200Pa ≤ P_{dif} ≤ +200Pa 1Pa for P_{dif} <-200Pa or P_{dif} > +200Pa	0.001 PSI
Intrinsic uncertainty	±0.5% FS ±1pt	±0.5% FS ±1pt

Specified measurement range	-245.0 to +245.0 daPa	-24.50 to +24.50hPa
Resolution	0.01 daPa for -20 daPa ≤ P_{dif} ≤ +20 daPa 0.1 daPa for P_{dif} <-20 daPa or P_{dif} > +20 daPa	0.001hPa for -2 Pa ≤hP_{dif} ≤ +2hPa 0.01hPa for P_{dif} <-2hPa or P_{dif} > +2hPa
Intrinsic uncertainty	±0.5% FS ±1pt	±0.5% FS ±1pt

Specified measurement range	-24.50 to +24.50mbar	-18.38 to +18.38mmHG
Resolution	0.01mbar	0.001mmHG for -2mmHG ≤ P_{dif} ≤ +2mmHG 0.01mmHG for P_{dif} <-2mmHG or P_{dif} > +2mmHG
Intrinsic uncertainty	±0.5% FS ±1pt	±0,5% FS ±1pt

Specified measurement range	-0.723 to +0.723 inHG	-249.8 to +249.8mmH2O
Resolution	0.001 inHG	0.1mmH_2O
Intrinsic uncertainty	±0.5% FS ±1pt	±0.5% FS ±1pt

Specified measurement range	-9.84 to +9.84 inH2O
Resolution	0.001mmH_2O for -2mmH_2O ≤ P_{dif} ≤ +2mmH_2O 0.01mmH_2O for P_{dif} <-2mmH_2O or P_{dif} > +2mmH_2O
Intrinsic uncertainty	±0.5% FS ±1pt

5.2.3. AIR SPEED MEASUREMENTS

Particular conditions of reference:
- The measurement is made just after an auto-zero.
- The instrument is horizontal.
- Inert gas (clean dry air).

Specified measurement range	2.0 to 5.0m/s	5.1 to 60.0m/s
Resolution	0.1m/s	0.1m/s
Intrinsic uncertainty	±0.7m/s	±0.5% R ±0.3m/s

Specified measurement range	7.2 to 216km/h	393 to 9999fpm	4.4 to 134.0mph
Resolution	0.1km/h	1fpm	0.1mph

5.2.4. AIR FLOW MEASUREMENTS

Particular conditions of reference:
- The measurement is made just after an auto-zero.
- The instrument is horizontal.
- Inert gas (clean dry air).

The air flow is calculated by multiplying the air speed by the programmed area.
In consequence, the range of air flow measurement depends on the programmed area.

Specified measurement range	0.000 to 1.999m³/s	2.00 to 19.9m³/s	20.0 to 199.9m³/s	200 to 9999m³/s
Resolution	0.001m³/s	0.01m³/s	0.1m³/s	1m³/s
Intrinsic uncertainty	±2pt	±0.5% R ±1pt	±0.5% R ±1pt	±0.5% R ±1pt

Specified measurement range	0.00 to 1.99m³/h	2.0 to 199.9m³/h	200 to 9999m³/h
Resolution	0.01m³/s	0.1m³/s	1m³/s
Intrinsic uncertainty	±2pt	±0.5% R ±1pt	±0.5% R ±1pt

Specified measurement range	0.00 to 1.99l/s	2.0 to 199.9l/s	200 to 9999l/s
Resolution	0.01l/s	0.1l/s	1l/s
Intrinsic uncertainty	±2pt	±0.5% R ±1pt	±0.5% R ±1pt

Specified measurement range	0.00 to 1.99cfm	2.0 to 199.9cfm	200 to 9999cfm
Resolution	0.01cfm	0.1cfm	1cfm
Intrinsic uncertainty	±2pt	±0.5% R ±1pt	±0.5% R ±1pt

5.2.5. ATMOSPHERIC PRESSURE MEASUREMENTS

Particular condition of reference:
- Inert gas (clean dry air).

Specified measurement range	500 to 1.100hPa	7,25 to 15,95 PSI	500 to 1.100mbar
Resolution	1hPa	0.01 PSI	1mbar
Intrinsic uncertainty	±4pt	±6pt	±4pt

5.3. VARIATION IN THE DOMAIN OF USE

5.3.1. TEMPERATURE MEASUREMENTS

Quantities of influence	Limits of the range	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to +50°C		(±0.03% R ±0.15)/10°C

Ageing of the thermocouple
After 8,000 hours of use, the intrinsic error increases by ±0.015% R every 1000h.

Self-heating
The self-heating of the instrument is low (<0.5°C) whether it is powered by batteries or via the mains adapter.

In recorder mode, when the instrument is connected to a PC via the USB port, the self-heating of the instrument is generally 0.5°C, and in consequence the error on the temperature measurement is 0.5°C.

Common mode rejection
No influence.

5.3.2. DIFFERENTIAL PRESSURE

Quantities of influence	Limits of the range	Maximum variation of the measurement
Temperature	-10 to +50°C	(±0.1%L ±2 Pa)/10°C

5.3.3. AIR SPEED MEASUREMENTS

Quantities of influence	Limits of the range	Maximum variation of the measurement
Temperature	-10 to +50°C	±0.2m/s /10°C

5.3.4. AIR FLOW MEASUREMENTS

With an area of 314cm^2 (hose 20cm in diameter)

Quantities of influence	Limits of the range	Maximum variation of the measurement
Temperature	-10 to +60°C	from 226 to 565m^3/h: (±34m^3/h)/10°C from 566 to 6786m^3/h: (±0.2% R ±11m^3/h)/10°C

5.3.5. ATMOSPHERIC PRESSURE MEASUREMENTS

Quantities of influence	Limits of the range	Variation of the measurement	
		Typical	Maximum
Temperature	-10 to +50°C	±1hPa	

5.4. MEMORY

The size of the flash memory containing the records is 8 MB.

This capacity is sufficient to record a million measurements. At each measurement, the temperature and pressure, or the air speed or the air flow or the atmospheric pressure, are recorded with the date, the time, and the unit.

The individual measurements are recorded in the file named **objects.icp**.
The recordings are in the file named **RECdate_hour_name.icp**.
The MAP recordings are in the file named **MAPdate_hour.icp**.

5.5. USB

Protocol: USB Mass Storage
Maximum transmission speed: 12 Mbit/s
Type B micro-USB connector

5.6. BLUETOOTH

Bluetooth 4.0 BLE
Range 10m typical and up to 30m in line of sight.
Output power: +0 to -23 dBm
Nominal sensitivity: -93 dBm
Maximum transfer rate: 10 kbits/s
Average consumption: 3.3 µA to 3.3 V.

5.7. POWER SUPPLY

The instrument is supplied by three 1.5V LR6 or AA alkaline batteries. It is possible to replace the batteries by rechargeable NiMH batteries of the same size. But the rechargeable batteries, even when correctly charged, will not reach the voltage of the alkaline batteries and the life indicated will be or .

The voltage range ensuring correct operation is from 3 to 4.5V for the alkaline batteries and 3.6V for the rechargeable batteries. Below 3V, the instrument stops making measurements and displays BAt.

Battery life (with the Bluetooth connection deactivated) is:
in stand-alone mode, 500h
in recording mode: 3 years at rate of one measurement every 15 minutes.

The instrument can also be powered via a USB-micro USB cord, connected either to a PC or to a wall outlet via a mains adapter.

> 110 VAC
< 240 VAC
50 / 60 Hz
2,5 W

5.8. ENVIRONMENTAL CONDITIONS

For use indoors and outdoors.

Operating range	-10 to 60°C and 10 to 90% RH without condensation
Storage range	-20 to +70°C and 10 to 95% RH without condensation, without batteries
Altitude	< 2000m, and 10,000m in storage.
Pollution degree	2

5.9. MECHANICAL CHARACTERISTICS

Dimensions (L x W x D)	158 x 72 x 34mm
Pressure connectors	dia. 6.2mm, (fluted)
Mass	270g approximately
Inrush protection	IP20 per IEC 60529.
Drop impact test	1m per IEC/EN 61010-2-030 or BS EN 61010-2-030.

5.10. COMPLIANCE WITH INTERNATIONAL STANDARDS

The instrument is compliant with standard IEC/EN 61010-2-030 or BS EN 61010-2-030.

5.11. ELECTROMAGNETIC COMPATIBILITY (CEM)

The instrument is compliant with standard IEC/EN 61326-1 or BS EN 61326-1.

6. MAINTENANCE

Except for the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an “equivalent” may gravely impair safety.

6.1. CLEANING

To ensure good measurement quality, the pressure connector must be kept perfectly clean.

Switch the instrument off.

Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth or forced air. Do not use alcohol, solvents, or hydrocarbons.

6.2. REPLACEMENT OF BATTERIES

The symbol indicates the remaining battery life. When the symbol is empty, all of the batteries must be replaced.

- Switch the instrument off.
- Refer to §1.4 for the replacement procedure.

Spent primary and storage batteries must not be treated as ordinary household waste. Take them to the appropriate collection point for recycling.

6.3. UPDATING THE EMBEDDED SOFTWARE

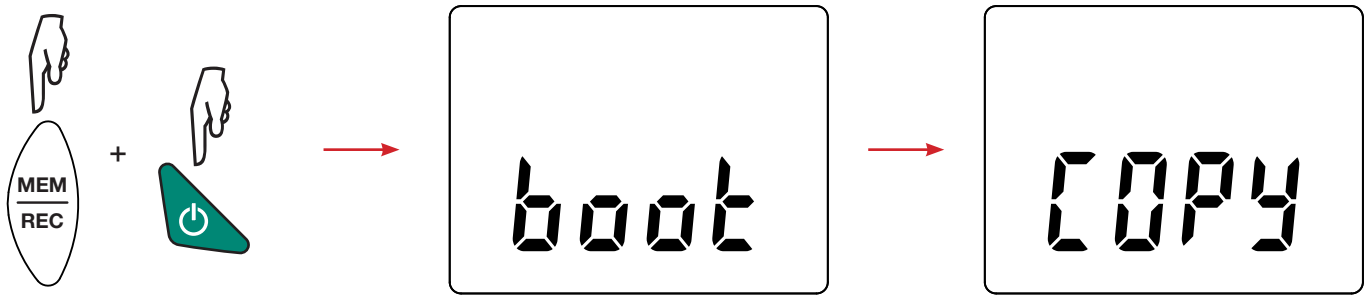
With a view to providing, at all times, the best possible service in terms of performance and technical improvements, Chauvin Arnoux offers you the possibility of updating the internal software of this instrument by downloading, free of charge, the new version available on our web site.

See you on our site:
www.chauvin-arnoux.com
Then go to “Support”, then “Download our software”, then “CA 1550”.

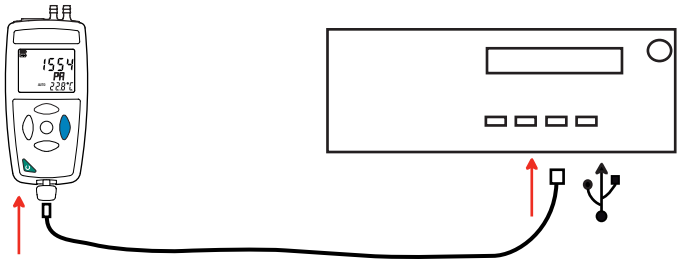
Updating the embedded software may reset the configuration and cause the loss of the recorded data. As a precaution, save the data in memory to a PC before updating the embedded software.

Embedded software update procedure

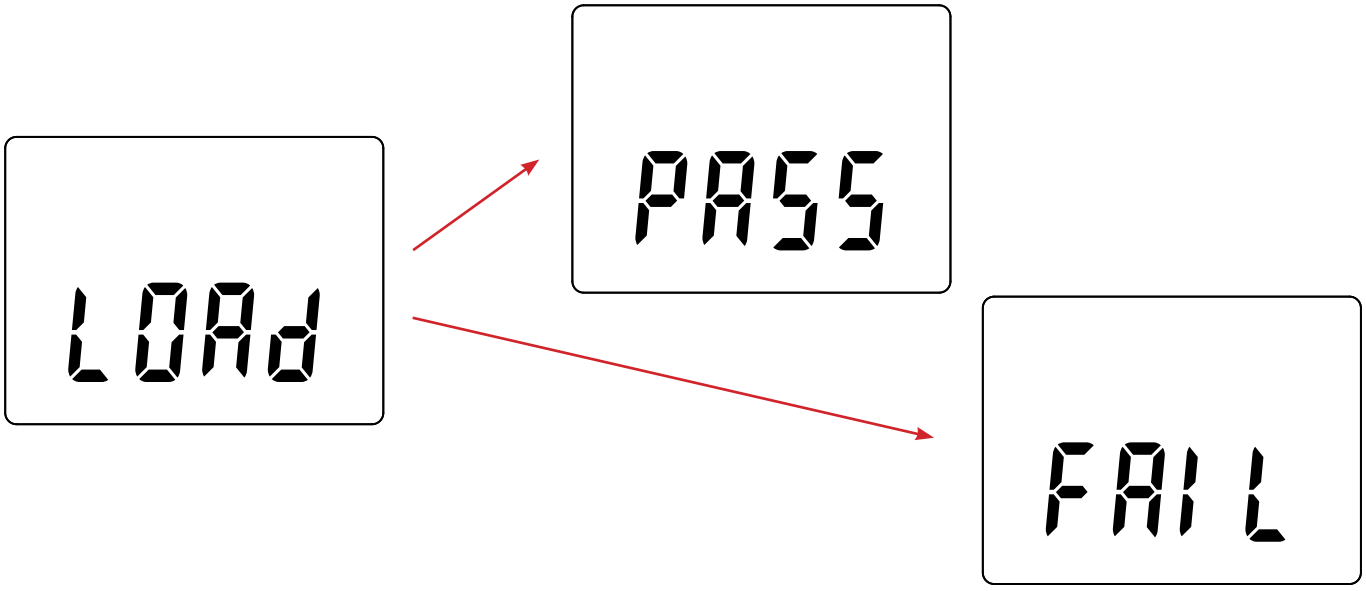
- Download the .bin file from our web site, then press and hold the **MEM** key and switch the instrument on by pressing the ⏻ key. The instrument displays BOOT.



- Release the keys and the instrument displays COPY, indicating that it is ready to receive the new software.
- Connect the instrument to your PC using the USB cord provided.



- Copy the .bin file to the instrument as if were a USB key.
- When the copying is done, press the **MEM** key and the instrument displays **LOAD**, indicating that the software is being installed.



- When installation is done, the instrument displays PASS or FAIL according to whether or not the operation succeeded. If installation fails, download the software again and repeat the procedure.
- Then the instrument restarts normally.

After the internal software is updated, it may be necessary to reconfigure the instrument (see §4.5.).

7. WARRANTY

Except as otherwise stated, our warranty is valid for **24 months** starting from the date on which the equipment was sold. Extract from our General Conditions of Sale, provided on request.

The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment.
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff.
- Work done on the device by a person not approved by the manufacturer.
- Adaptation to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual.
- Damage caused by shocks, falls, or floods.

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